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10/790,584	03/01/2004	Li Shu	DPL-031	9861

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EXAMINER	
HO, HUY C	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/790,584	SHU ET AL.	
	Examiner	Art Unit	
	Huy C. Ho	2617	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 May 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 05/04/2007 have been fully considered but they are not persuasive.

The argued features, i.e., independent claims 1 and 22, as amended, recite predicting a future physical location of a destination node of a message and selecting intermediate nodes for relaying the message based on the predicted physical location. The technique facilitates the routing of messages according to a future network topology (e.g., where a particular node will be) and directs messages accordingly. The prediction of a future location of a destination node is disclosed in the specification of the invention as follows:

In general, the nodes closer to the destination possess more up-to-date information on the location and trajectory of the destination. Thus, according to principles of the invention, nodes in a network may store and update information about the location and trajectory of other nodes in the network. Prior to sending a message or message unit, an originating node can estimate a destination node's location within the network at the expected time of receipt, and may determine an associated route through the network. The estimate can be shared with, and updated by, nodes in a pathway through the network. Nodes in the network may share their location and trajectory information with other nodes in the network, for example, via attachments to message units transmitted by the node. Such information can also be requested from other nodes, for example, by transmitting general and/or targeted broadcasts (refer to the invention's specification, page 4 lines 5-22), reads upon Ahmed and in view of Kennedy and Moon as follows.

Ahmed is discussing a location-based routing method for Mobile Ad-hoc networks that taking in consideration of nodes' mobility, destination nodes are in regions that are far away from a originating node, i.e., outside of the originating node's local topology. Per this consideration, Ahmed uses the geometry-based routing protocol (GRP), which a source node routes a packet to a destination node

outside of its local topology as a function of the distance to the location of a destination node. Each node stores, maintains and exchanges the updated location information with other nodes in the ad hoc network, thus the information is new and current. Specifically, Ahmed is discussing:

Each node maintains a list of the locations of all known nodes along with a time stamp as to when that information was generated by those nodes. Let p(i, k) be the position of node k as "seen" by node i and s(i, k) be a "time-stamp" at which the positional information was generated at node k. The time-stamp provides a vehicle for determining the age of the position information. (As can be observed from the discussion above, p(i, k) is a variation of l(v) and is two dimensional GPS information. Illustratively, s(i, k) is an integer value determined as a function of the month, day, year and time-of-day (using a 24 hour clock, e.g., 3:00 PM is 1500 hours).) The location table of FIG. 3 is modified to include the time-stamp field as shown in FIG. 9, where the reference node, i, is node 150 of FIG. 1. For completeness, the table of FIG. 9 includes entries for node i itself (here, represented by node 150). This list of position and timestamps at a node i, is referred to as the location list, or location table, L(i), at node i. (**Ahmed, see col 8 lines 1-15**).

Each node periodically transmits its position to its direct neighbors (or, alternatively, to all nodes in its local topology) once every t.sub.1 seconds. Further, once every t.sub.2 seconds, each node transmits its location list L(i) to its direct neighbors (nodes within one hop). A flow chart of a lazy update method is shown in FIG. 10 for use in a receiving node, j. Let the receiving node j be a direct neighbor of node i. In step 905, the receiving node, j, receives location information p(i, k) from all nodes that are its direct neighbors. In step 910, receiving node j, updates its location list L(j) to reflect the current position and time-stamp for its direct neighbor nodes. (At this point it is presumed that the time-stamp information is more recent than previous local topology location transmissions stored in L(j).) In step 915, node j receives the location lists, L(i)s, from direct neighbor nodes. In step 920, node j adds and/or modifies entries in its location list LO) by performing the following computation for each node k.epsilon.V listed

on each of the received location lists (effectively "merging" the various location lists): If s(i, k)>s(j, k) then s(j, k)=s(i, k) and p(j, k)=p(i, k); Else, do nothing. **(Ahmed, see column 8 lines 15-35).**

Ahmed is also discussing a source node searches its local topology table to see if a destination node is part of its local list. If the destination node is outside of its local topology, the source node uses the GRP to identify the closest node, in its local topology, to the destination node. The source node evaluates the distance from the destination node to each node in its local topology, i.e., the destination node's local topology. One the closest node is identified, the source node sends a packet to that node that has the minimum distance to the destination node **(refer to Ahmed, see column 2 lines 10-40 and column 5 lines 1-30)**. Per this discussion, Ahmed discloses predicting a future physical location of a destination node of a message and selecting intermediate nodes for relaying the message based on the predicted physical location, the technique facilitates the routing of messages according to a future network topology (e.g., where a particular node will be) and directs messages accordingly.

As a result, the argued features are written such that they read upon the cited references.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-8, 10-16, 21-23 and 25 are rejected under 35 U.S.C. 102(e) as being anticipated by **Ahmed et al. (7,006,453).**

Consider claim 1, Ahmed teaches a method for communicating via a network comprising nodes **(see the abstract, fig 1)**, the method comprising:

predicting a future physical location where a destination node will be located upon arrival of a message unit relayed to the destination node via the network **(see the abstract, col 2 lines 15-40, col 4 lines 64-67, col 5 lines 1-30)**; and

selecting an intermediate node for relaying the message unit between a source node and the destination node in response to the predicted a future physical location of the destination node **(col 2 lines 15-40, col 4 lines 64-67, col 5 lines 1-30 and 48-60)**.

Consider claim 22, Ahmed teaches an apparatus for routing communications via a network comprising nodes **(figure 11, see col 2 lines 64-67, col 3 lines 1-25, 50-65)**, the apparatus comprising:

a location prediction processor for predicting a future physical location where a destination node will be upon arrival of a message unit at the destination node **(figure 11, see col 2 lines 64-67, col 3 lines 1-25, 50-65)**;

a relay node selector for selecting an intermediate node for relaying the message unit between a source node and the destination node in response to the predicted a future physical location of the destination node **(figure 1, col 2 lines 15-40, col 4 lines 64-67, col 5 lines 1-30)**.

Consider claim 2, as applied to **claim 1**, Ahmed teaches selecting the intermediate node comprises predicting locations where a plurality of nodes of the network will be upon arrival of the message unit at each of the plurality of nodes, and performing the selection in response to the predicted location of the destination node and the predicted locations of the plurality of nodes **(see col 2 lines 20-40, col 4 lines 7-24, 60-67, col 5 lines 1-30)**.

Consider claim 3, as applied to **claim 2**, Ahmed teaches wherein the steps of predicting the

locations of the plurality of nodes and selecting the intermediate node are performed by at least one of the plurality of nodes **(col 2 lines 20-40, col 4 lines 7-24, 60-67, col 5 lines 1-30).**

Consider claim 4, The method of **claim 3**, Ahmed teaches wherein the steps of predicting the locations of the plurality of nodes and selecting the intermediate node are performed simultaneously (see **figures 4, 7 col 2 lines 13-40, col 4 lines 25-67, col 5 lines 1-30,** describing destination locations being located by using the geometry-based routing protocol with intermediate nodes inherently occur at same time).

Consider claim 5, as applied to **claim 3**, Ahmed teaches wherein predicting the locations of the plurality of nodes occurs upon arrival or prior to arrival of the message unit at each of the plurality of nodes **(col 1 lines 65-67, col 2 lines 1-10, col 5 lines 48-60).**

Consider claim 6, as applied to **claim 3**, further comprising sharing the predicted locations of the plurality of nodes with other nodes of the plurality of nodes **(see col 2 lines 29-40, col 3 lines 10-15, 50-67, disclosing each node knows other nodes' location information)**.

Consider claim 7, as applied to **claim 2**, wherein selecting the intermediate node comprises predicting locations where a plurality of nodes of the network will be upon arrival of the message unit at each of the plurality of nodes, and performing the selection in response to the predicted location of the destination node and the predicted locations of the plurality of nodes for relaying the message via at least one of the plurality of intermediate nodes **(see col 2 lines 15-40, col 4 lines 7-35, col 5 lines 1-30)**.

Consider claim 8, as applied to **claim 7**, further comprising causing at least one of the source node and the plurality of nodes to attach to the message unit state information comprising at least one of a prior speed, a prior direction, a prior destination, and a prior location of at least one of the nodes **(see col 3 lines 1-25, col 8 lines 1-15)**.

Consider claim 10, as applied to **claim 2**, Ahmed teaches wherein selecting the intermediate node further comprises selecting a sequence of at least one intermediate node of the plurality of nodes

whose predicted location is closer to the predicted location of the destination node than is at least one other node of the plurality of nodes **(col 4 lines 64-67, col 5 lines 1-30)**.

Consider claim 11, as applied to **claim 1**, Ahmed teaches wherein selecting the intermediate node comprises selecting a node whose predicted location is within a transmission range for receipt of the message unit **(col 3 lines 25-36, col 4 lines 33-45, col 7 lines 55-64)**.

Consider claim 12, as applied to **claim 1**, Ahmed teaches wherein the location of the destination node is predicted in response to state information associated with a prior state of the destination node, the state information comprising at least one of a prior speed, a prior direction, and a prior location of the destination node, and a time stamp identifying an age of the state information **(see col 3 lines 1-25, col 8 lines 1-15).**

Consider claim 13, as applied to **claim 12**, Ahmed teaches further comprising causing the state information to be attached to the message unit, and causing at least one of the intermediate node and the destination node to retrieve, alter, and reattach the state information, wherein altering comprises (i) replacing at least a portion of the state information with information having a more recent time stamp or (ii) adding information having a more recent time stamp **(see col 3 lines 1-25, col 7 lines 64-67, col 8 lines 1-15 and lines 40-55)**.

Consider claim 14, as applied to **claim 1**, Ahmed teaches further comprising causing a node of the network to broadcast to a plurality of nodes of the network a request for state information of the plurality of nodes **(see col 6 lines 34-50)**.

Consider claim 15, as applied to **claim 1**, Ahmed teaches further comprising attaching to the message unit information identifying the predicted location of the destination node **(col 2 lines 13-30, col 4 lines 45-67, col 5 lines 1-30)**.

Consider claim 16, as applied to **claim 1**, Ahmed teaches further comprising causing the intermediate node to select a next intermediate node for relaying the message unit between the

intermediate node and the destination node in response to the predicted location (**see figures 1, 2, 5, 7 and 9, col 4 lines 7-32, col 5 lines 1-30**).

Consider claim 21, as applied to **claim 1**, Ahmed teaches wherein the message unit is associated with a binary data packet, and further comprising repeating predicting and selecting for each one of a series of data packets (**see col 6 lines 5-20**).

Consider claim 23, as applied to **claim 22**, Ahmed teaches further comprising a state information storage unit for storing state information associated with at least one of a prior state and a predicted state of at least one node of the network (**see fig 11, number 960, col 3 lines 1-25, col 5 lines 48-60**).

Consider claim 25, as applied to **claim 22**, Ahmed teaches further comprising a state information examination unit for examining state information attached to the message unit (**col 3 lines 1-25**).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. **Claim 9** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Ahmed et al. (7,006,453),** further in view of **Kennedy (2004/0219909).**

Consider claim 9, as applied to **claim 7,** Ahmed fails to teach feature of causing one of the selected plurality of intermediate nodes to alter a routing list of future intermediate nodes of the selected plurality of intermediate nodes when the predicted location of the destination node was based on outdated information, however, it is very noticeable Ahmed teaches nodes use the geometry-based routing protocol to identify other closest nodes (**see col 4 lines 64-67 and col 5 lines 1-30**). In an analogous art, Kennedy teaches the feature of alter a routing list of future intermediate nodes of the selected plurality of intermediate nodes when the predicted location of the destination node was based on outdated information (**see the abstract, pars [6], [11], [12], [28], [30], [31]**). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention was made to modify and incorporate Kennedy teachings into Ahmed invention in order to have the feature of causing one of the selected plurality of intermediate nodes to alter a routing list of future intermediate nodes of the selected plurality of intermediate nodes when the predicted location of the destination node was based on outdated information.

7. **Claims 17-20, 24 and 26** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Ahmed et al. (7,006,453)**, further in view of **Moon et al. (2005/0076054)**.

Consider claim 17, as applied to **claim 1**, Ahmed fails to teach acquiring geographic information identifying physical features, however, it is noticeable that Ahmed teaches pilot signals being transmitted between nodes in a purpose of sensing the presence of other nodes in order to exchange information for setting up links among them (**see col 3 lines 1-25**). In an analogous art, Moon teaches the featuring of acquiring geographic information identifying physical features (**see pars [19], [20], [36], [39], [46], [50], [58], [65]-[67], [72], [73]**). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention was made to modify and incorporate Moon teachings into Ahmed invention in order to have the feature of acquiring geographic information identifying physical features.

Consider claim 18, as applied to **claim 17**, Ahmed as modified by Moon, teaches wherein the physical features interfere with network communications (**pars [19], [20], [36], [39], [46], [50], [58], [65]-[67], [72], [73]**).

Consider claim 19, as applied to **claim 17**, Ahmed as modified by Moon, teaches wherein acquiring geographic information comprises inferring the physical features from attenuation of at least one transmitted signal (**pars [19], [20], [36], [39], [46], [50], [58], [65]-[67], [72], [73]**).

Consider claim 20, as applied to **claim 17**, Ahmed as modified by Moon, teaches wherein selecting the intermediate node comprises selecting a node whose predicted location is essentially unobstructed by the physical features (**pars [19], [20], [36], [39], [46], [50], [58], [65]-[67], [72], [73]**).

Consider claim 24, as applied to **claim 22**, Ahmed as modified by Moon, further teaches a geographic information storage unit for storing geographic information identifying physical features that obstruct the network communications (**see figure 11, numbers 960 and 970**).

Consider claim 26, as applied to **claim 25**, Ahmed as modified by Moon, further teaches wherein the state information examination unit examines geographic information attached to the message unit **(col 3, lines 1-25)**.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Huy C. Ho whose telephone number is (571) 270-1108. The examiner can normally be reached on Monday - Friday, 8:00 a.m. - 5:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duc Nguyen can be reached on 571-272-7503. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-

direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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